

**Work Order ID 75310**

October-20-11 10:27:09 AM

**\*75310\***

Page 1

Item ID: D212-664-107

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev B (DEO)

100

0.00

**\*100\***

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG002

110

0.00

**\*110\***

Packaging

Packaging

Memo

0.00

Packaging

120

0.00

**\*120\***

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

JH ✓  
S. ulul15

JH GERMES 11-11-14

JW  
MO

11/10/25

MO  
JW

11/10/25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 75310

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Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00

**\*130\***

QC

Memo

0.00

Quality Control

140

0.00

**\*140\***

Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Cut tube as per inspection dwg and deburr ends. \*\*\*ensure saw is square\*\*\*

2-Position cuffs on tube ensure proper positioning

3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10

4-Transfer drill rivet holes from cuff into tube.

5-Identify cuff position and Batch # on each and identify tube as per dwg D212-664-107.

6- Inspect surface damage

7- Deburr and realodine cuff.

BT 11-10-25

BT 11-10-24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Item ID: D212-664-107

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Reference:

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Cust Item ID:

Customer:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

Crosstubes Chemical Conversion

0.00

**\*150\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

11-10-26

160

QC3- Inspect Part Finish

0.00

**\*160\***

QC

Memo

0.00

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

**\*170\***

QC

Memo

0.00

Quality Control

11/10/27

11/10/27



**Work Order ID 75310****\*75310\***

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Required Date: 10/28/11 Req'd Qty: 1.00

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Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursTool ID Tool # Plan Accept Reject Reject Insp.  
Code Qty Qty Number Stamp

180

Outsource process - NDT per QSI038 4.1

0.00

**\*180\***

Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038Or  
Issue P/O: 15287 LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

CL 11/10/28 (1)

190

Packaging

0.00

**\*190\***

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

PL 11/14/28 (1)

200

QC5- Inspect part completeness to step on W/O

0.00

**\*200\***

QC

Memo

0.00

Quality Control

Inspect for damage &amp; ensure results are as per Dwg D212-664-107

JL 11-10-20





# Work Order ID 75310

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Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

210

0.00

**\*210\***

Crosstubes

Crosstubes

Memo

0.00

*PT 11-10-31*

I-Rivet Cuffs as per Dwg D212-664-147, with Sika flex in Between tube & Cuff  
A/R SIKAFLEX -241/-291 BATCH: 119399

215

QC5- Inspect part completeness to step on W/O

0.00

**\*215\***

QC

Memo

0.00

Quality Control

*m/ 11/10/31 (1)*



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**\*N900040100\***

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Revision ID:

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Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

220

SprayPaint

0.00

**\*220\***

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 10:00

Finish Time: 11:00

PAINT:

Start Time: 3:00

Finish Time: 4:00

11-10-31

230

QC14- Inspect Spray Paint

0.00

**\*230\***

QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

11/11/01 ①



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Item ID: D212-664-107

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

240

**\*240\***

Crosstubes

Crosstubes

Crosstubes

Memo

1- Assemble as per Dwg D212-664-147

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,  
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9563 and QSI 015

A/R Proseal 890 Batch: 119396

3- Torque bolts as per dwg

0.00

0.00

0.00

0.00

11 11 10 (1)

11-11-14

250

**\*250\***

QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

Subuluy



**Work Order ID 75310**

October-20-11 10:27:09 AM

**\*75310\***

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Item ID: D212-664-107

Accept

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Stop **\*NS2\***

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Start Date: 10/20/11 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 10/28/11 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

255

Pick Kit

0.00

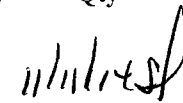
**\*255\***

Packaging

Memo

0.00

Packaging



260

QC4- 100% Inspect kits for completeness

0.00

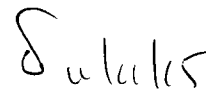
**\*260\***

QC

Memo

0.00

Quality Control



270

Packaging

0.00

**\*270\***

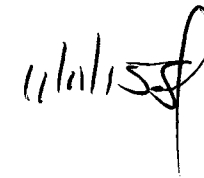
Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-107







**Work Order ID 75310**

October-20-11 10:27:09 AM

**\*75310\***

Page 9

Item ID: D212-664-107

Revision ID:

Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11 Start Qty: 1.00

Required Date: 10/28/11 Req'd Qty: 1.00

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
---------	--------	-----------	------------	------------	---------------	-------------

280

QC21- Final Inspection - Work Order Release

0.00

**\*280\***

QC

Memo

0.00

Quality Control

Accept

**\*N900040100\***Setup Start **\*NS1\***Stop **\*NS2\***

Cust Item ID:

Customer:

11/11/11  
mf  
11-11-16



# Picklist Print

October-20-11 10:27:08 AM

Page 1

Work Order ID: 75310

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

## Comments:

IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec  
DD verf:EC  
IPP Rev:D 10.05.27 added pick kit  
IPP Rev:E 11.10.17 added SEQ 215 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D212-664-107TRN  
Crosstube Turning Detail

Manufactured No

140 Each 4.0000

1 1

Location	Loc Qty	Loc Code
LG 74572	1	
74250	1	
LG046	3	
74249	1	
74569	1	
74570	1	

no 11/10/25

D3659-1  
CUFF

Manufactured No

220 Each 30.0000

2 2

Location	Loc Qty	Loc Code
ST477	30	
67005	3	
74737	14	
75173	13	

8 11-10-25

CR3212-4-06  
CHERRY RIVET

Purchased No

240 Each 730.0000

44 44

Location	Loc Qty	Loc Code
ST311	730	
112492	18	
112794	712	

ET 11-10-31

x44

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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October-20-11 10:27:09 AM

Work Order ID: 75310

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450  
RUBBER CUSHION

Manufactured No

240 Each 117.5600 4 4

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	107.76	
67353	3	
68893	6	
70113	0.56	
71354	0.2	
74113	98	
LG055	9.8	
72967	9.8	

*M 11.11.10*

MS21920-25  
Clamp(per MIL-DTL-8783C)

Purchased No

240 Each 42.0000 4 4

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	36	
113281	0	
113282	0	
118142	4	
118183	32	
LG050	6	
116264	2	
117998	4	

*M 11.11.10*

B# 119339

D2893-1  
2.75 Support

Manufactured No

240 Each 15.0000 2 2

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG052	15	
72865	15	

*M 11.11.10*

B# 74768

5 D3428-1  
Placard

Manufactured No

260 Each 23.0000

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST053	23	
72048	3	
73498	20	

*11/11/10 SP*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Page 3

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Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 10/20/11

Required Date: 10/28/11

Start Qty: 1.00

Required Qty: 1.00

AN6-35A Purchased

No

260 Each 56.0000

4

4

BOLT

## Location

## Loc Qty

## Loc Code

ST342

56

118422

26

118838

30

Purchased

No

260 Each 57.0000

4

4

AN6-36A

Bolt

## Location

## Loc Qty

## Loc Code

ST342

57

118012

1

118422

26

118838

30

Purchased

No

260 Each 1.744.0000

6

6

MS21042L6

Nut

## Location

## Loc Qty

## Loc Code

ST300

744

117677

88

118384

8

118927

48

118968

600

ST518

1000

119075

1000

Purchased

No

260 Each 0.0000

18

18

AN960JD616

Washer

NAS1149D0663J

1119075 always

October-20-11 10:27:09 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

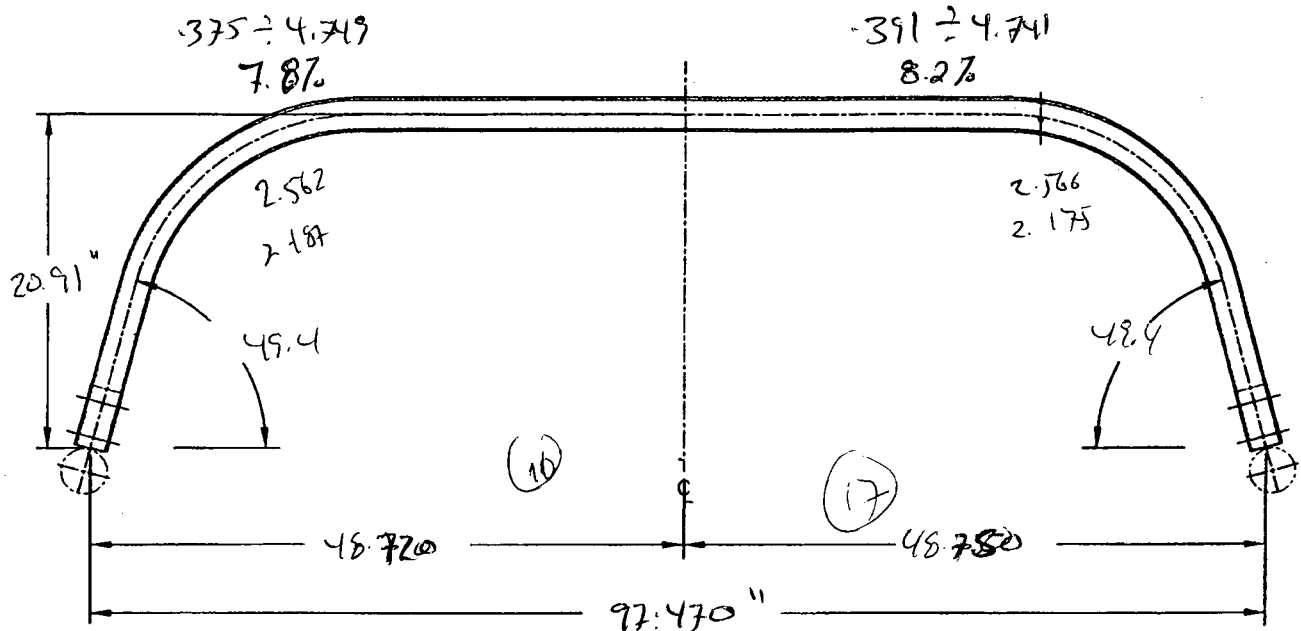
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries



DART AEROSPACE LTD		Work Order: 75310
Description: Crosstube Low Fwd (205/212/412)		Part Number: D212-664-107
Inspection Dwg: D212-664-147 Rev: B		Page 1 of 1

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments	
Sine Az.	7.8% crush @ 16 Passes
Sine Bx	8.2% crush @ 17 Passes
(see note 10)	

QC15 Inspection	8
Date	11/10/25

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	



Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128  
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)  
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD  
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%  
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.  
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE  
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS  
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF  
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.  
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

*w/b 75310*

DEO ATTACHED

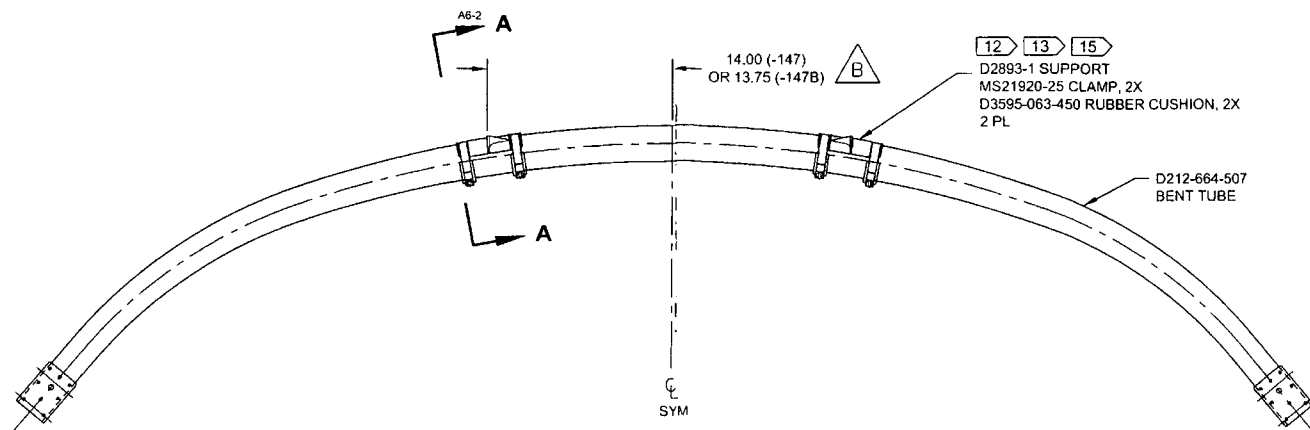
PER ECD#1164  
A 11.07.28  
UNDER REVIEW

RELEASED  
2009-10-29

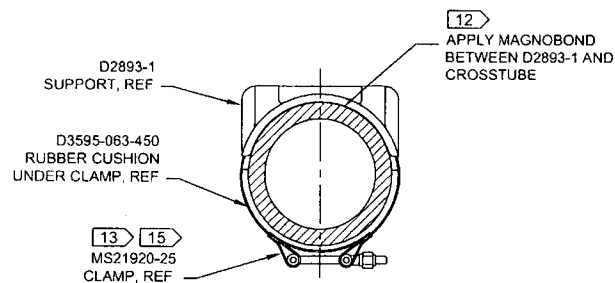
B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF		
DRAWN	RF		
CHECKED	RF		
MFG. APPR.	RF		
APPROVED	RF		
DE APPR.	RF		
DATE	09.09.30		

<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D212-664-147	REV. B SHEET 1 OF 4
TITLE CROSSTUBE (205/212/412 LOW FWD)	SCALE NTS
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**D212-664-147/-147B  
ASSEMBLY DETAIL**



**SECTION A-A** 05-2  
SCALE 4X

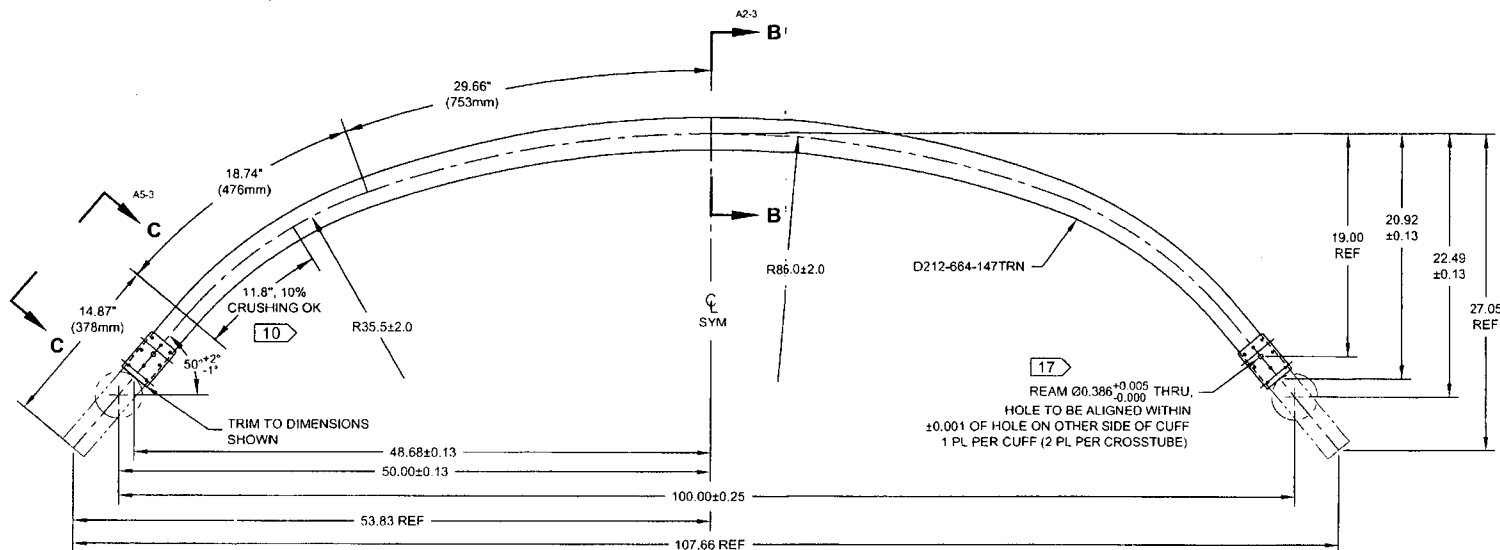
DEO ATTACHED

ECN #11-614  
K.07.28  
UNDER REVIEW  
CP 11.06.13

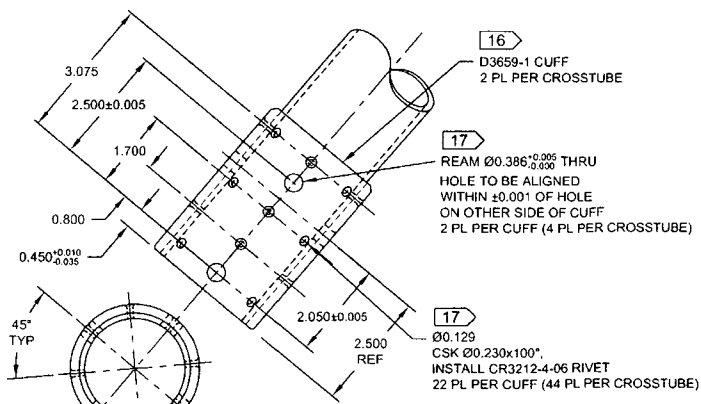
**RELEASED**  
2009-10-29

DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. B
MFG. APPR.	97	D212-664-147	SHEET 2 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (205/212/412 LOW FWD)	NTS
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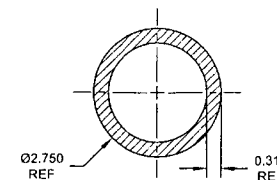




**D212-664-507**  
**BENDING AND DRILLING DETAIL** (10) B



**VIEW C-C: CUFF DETAIL** D7-3  
SCALE 4X



**SECTION B-B** D5-3  
SCALE 4X

DEO ATTACHED

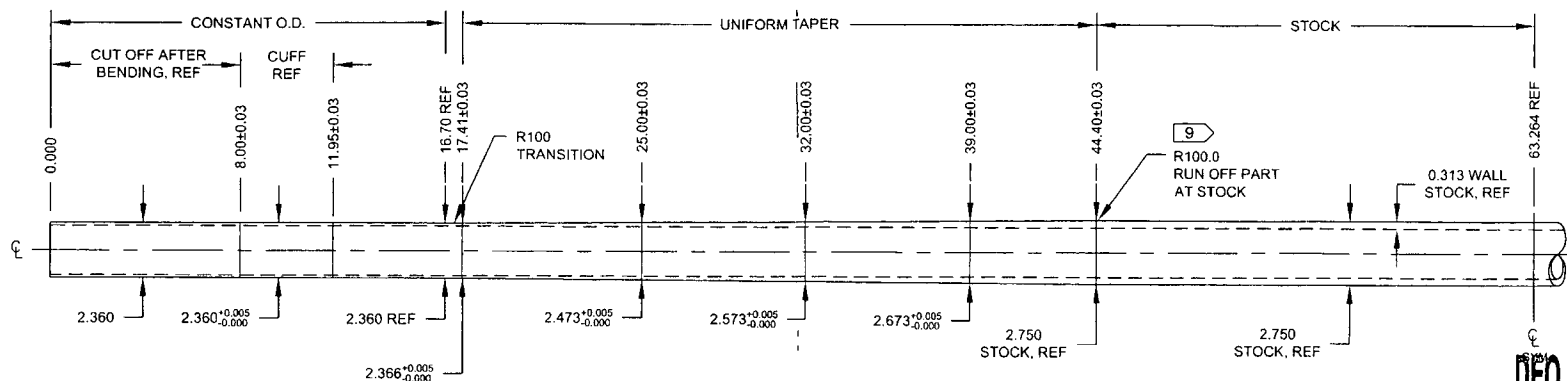
62011-614  
11.09.20  
UNDER REVIEW  
4/10.13

**RELEASED**  
2009-10-29

DESIGN	RF	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
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**D212-664-147TRN**  
**TURNING DETAIL**

**DEO ATTACHED**

ECO #1-614  
11.07.26  
**UNDER REVIEW**  
11/26/13

**RELEASED**  
2009-10-29

DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. B
MFG. APPR.	97	D212-664-147	SHEET 4 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (205/212/412 LOW FWD)	NTS
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DRAWING NO. D212-664-147	TITLE CROSSTUBE ASS'Y (205 LOW FWD)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-147-B-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 9P	CHECKED ASS	MFG. APPR. 188	APPROVED MP		DE APPR. H		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -147	Qty -147B	Part Number	Description
9	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---------------------------------------------------------------------------------------------------------------

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRABE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

**RELEASED**  
2011-07-28  
VW





# RAPPORT D'ESSAI NON DESTRUCTIF

(SUITE)

RAPPORT #

7-11198

PAGE 2 DE 2

CLIENT Dart Aerospace DATE 27 octobre 2011 HEURE ☒ AM ☐ PM  
ATTENTION Mme Linda Lavelle NO. TRAVAIL ACUREN 188-11-02376  
RÉSULTATS (☐ METRIQUE ☐ IMPÉRIAL)

Work	Order	ID	Crosstube	Item	ID	D
		74992				212-664-107
"	"	74991	"	"	"	212-664-207
"	"	75277	"	"	"	212-664-207
"	"	754990	"	"	"	212-664-207
"	"	75314	"	"	"	212-664-107
"	"	75313	"	"	"	212-664-107
"	"	74976	"	"	"	212-664-107
"	"	72743	"	"	"	407-667-205
"	"	72742	"	"	"	407-667-205
"	"	75310	"	"	"	212-664-107
"	"	75540	"	"	"	212-664-207
"	"	75542	"	"	"	212-664-207

All the crosstubes (12) Accepted  
No indication as found.

27-11-10-28

## Étendue des Services

L'entente selon laquelle le Groupe Acuren Inc. exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. n'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

## Norme de Diligence

Dans l'exécution des services, le Groupe Acuren Inc. applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

## SIGNATURES

REPRÉSENTANT  
À LA CLIENTÈLE

TECHNICIEN (SIGNATURE)

NAME (MOULÉE):

NIVEAU CGSB

No. ENREG. CGSB

NIVEAU SNT

No. ENREG. CGSB

NIVEAU CGSB

No. ENREG. CGSB

NIVEAU SNT

No. ENREG. CGSB

FTJ #:

RAPPORT  
REVISÉ PAR:

NOM

INITIALES



**ACUREN****RAPPORT D'INSPECTION PAR RESSUAGE**

P - 11198

CLIENT

ATTENTION

ADRESSE

PROJET

ITEM(S) EXAMINÉ

DATE

N° TRAVAIL  
ACUREN

N° CLIENT POWO

SITE DE TRAVAIL

ACCEPTATION STD.

PAGE

HEURE AM ☐ PM ☐

Dant Aerospace

Mme Linda Lancelle

1270 Aberdeen St, Hawkesbury, Ont, K6A 1K7

27 octobre 2011

188-11-02376

15287

Dant Usine

Asm 1417/QST 038

DATE/RÉV. 2005

Crosstubes inspection (Fluorescent Penetrant)

12 x Crosstubes

**DESCRIPTION DES TRAVAUX**

N° PROCÉDURE

LT-002

DATE/RÉV. 2007

N° TECHNIQUE

LT-002

DATE/RÉV.

2007

N° ITEMS See on bottom

MATÉRIEL Aluminium

ÉPAISSEUR

Various

DESCRIPTION Inspection 100% (Penetrant Fluorescent) on surface external on 12 crosstubes

**DÉTAILS DES INSPECTIONS**

MÉTHODE :

☒ FLUORESCENT☐ VISIBLE☒ LAVABLE À L'EAU☐ MÉTHODE DISSOLVANT☐ PRÉ-ÉMULSIONNANT

MARQUE : Magnaflux

LUM. NOIRE S/N 16440

PUISS. > 1000  $\mu$  W/cm<sup>2</sup>☐ AMBIANT < 2 fc

PÉNÉTRANT : Zyglo ZLC7

TEMPS PÉNÉTRATION MIN.

10

MIN.

ÉQUIP. LUMIÈRE

☐ LAMP. POCHÉ☐ LAMP. CULASSE☐ PUISS. > 100 fc @ SURFACE

DISSOLVANT PÉNÉTRANT H2O

TEMPS SÉCHAGE MIN.

&gt;10

MIN.

AUTRES

Modèle LABINO

RÉVÉLATEUR SKD-52

TEMPS PÉNÉTRATION MIN.

10

MIN.

MÈTRE LUM. N/S

DATE CAL DUE

TYPE RÉVÉLATEUR

☒ NON AQUEUX☐ AQUEUX☐ SEC**SURFACE INSPECTÉE**

CONDITION SURFACE

☐ MEULÉE☐ SOUDÉE☐ MACHINÉE☐ GRENAILLÉE☒ MÉTAL PROPRETEMPÉRATURE SURFACE ☐ < - 4°C/ 20°F☐ - 4°C/ 20°F DE 10°C/50°F☒ 10°C/50°F DE 52°C/125°F☐ > 52°C/125°F**RÉSULTATS-**☐ MÉTRIQUE ☐ IMPÉRIAL

See other sheet for Results

27 11 10 28

**Étendue des Services**

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**Norme de Diligence**

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**SIGNATURES**

REPRÉSENTANT

TECHNICIEN (SIGNATURE)

NOM (MOULÉ):

Matt Murdoch

Pierre-Luc Dolan

1<sup>ER</sup> TECHNICIEN

ONGC NIVEAU 2 SNT NIVEAU 2

ONGC N° REG. 12205

Signature

Signature

2<sup>EME</sup> TECHNICIEN

ONGC NIVEAU SNT NIVEAU

ONGC N° REG.

FTJ#

RAPPORT

RÉVISÉ PAR:

NOM

INITIALES

BLANCHE - COPIE DU CLIENT

JAUNE - COPIE DU BUREAU

ROSE - COPIE DU TECHNICIEN

OR - COPIE DU BUREAU

PT Décembre 2005

